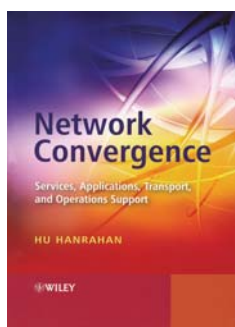# new books

NETWORK CONVERGENCE

Hu Hanrahan
Wiley www.wiley.com
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Hardback **£60.00**

Network convergence is *the* topic in the telecommunications arena both from a commercial management and technological perspective. How to combine many different services in one single network is a very strong motivational direction for both research and development.

This book provides a very thorough and surprisingly readable guide to the many different subtleties of network convergence. Moreover, it applies its perspective in a very unbiased way, focusing on the technological, historical and standardisation issues. This book would prove a valuable asset for any professional, either academic or industrial, who wants a great reference of what is going on in the background (and foreground) of modern convergence thinking.

The book opens with an interesting series of background historical cases which plot the route to convergence. These include the Internet and more significantly (with more depth in chapter 6) a review of the first classical convergence attempt: ISDN. The book sets out at an early stage an elegant framework for analysing convergence through the silo model of service integration. The model is a very powerful tool for expressing many of the control issues which are central to integrating network services of diverse types. The second chapter outlines the key features of a framework for a next generation network, This is loosely divided into subsections based on access networks, internet services, telecoms services, transport networks and operations support. This is succinctly summarised in a single figure which effectively provides a blueprint for the rest of the book.

There are then a series of chapters dedicated to these issues in more detail starting with software methodologies, which introduces the reference model of open distributed processing – a vital concept for understanding the rest of the analysis in the book.

In effect it is explaining the construction of a protocol at the most general and fundamental level. The next generation of services are outlined through examples of Managed Voice over IP, and integrated ICT enterprise systems. We then have a very good review of three major convergence attempts; ISDN, TINA and TIPHON.

Many positive ideas such as application, abstraction and control mechanisms (such as ATM) have been highlighted to be taken on into the next generation of services. This is then taken further into the example of current convergence being implemented through 3G systems and technology.

The book then closes on a very abstract discussion on application programming interfaces, suggesting several possible convergence models including an in-depth analysis of Parlay X web services followed by a short discussion of operations support mechanisms.

Finally this book must hold some sort of record for the most MLAs (multi-letter acronyms) used both in total and on a per page basis! This is offset, however by an excellent (and lengthy) list of abbreviations at the onset of the book.

Reviewed by **Tim Wilkinson**
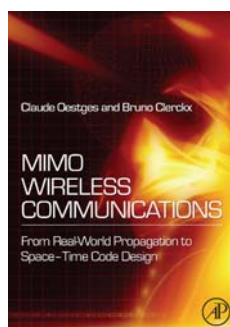
MIMO WIRELESS COMMUNICATIONS

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Multiple-input multiple-output (MIMO) communications and space-time coding have attracted massive research interest in the last decade. The first commercial applications of MIMO wireless systems are now appearing on the market in the form of wireless local area networks with enhanced data rates, i.e., IEEE 802.11n.

Besides hundreds of research papers, over a dozen books have also been published recently on this topic. Some of these focus on the antennas and propagation aspects whilst others approach the subject from the signal processing and information theoretic perspective.

This book provides a well-rounded treatment of all of these, with particular emphasis on the modelling of real-world MIMO propagation characteristics.

MIMO techniques rely on the use of multiple transmitting and receiving antennas to exploit the spatial dimension and enhance the data rate or quality of the communication channel. The knowledge of the channel's spatial properties is critical for MIMO system design and performance prediction. Therefore any realistic evaluation of a MIMO system must take into account the physical propagation conditions based on accurate channel models.

This book expends considerable effort on developing and explaining intuitive MIMO channel models that correspond closely to fundamental concepts of wave propagation. The discussion on dual-polarised MIMO is a welcome addition to spatial arrays that MIMO systems conventionally employ. However, a treatment of tri-polarised systems would have added value to the book.

Practical design constraints such as limited channel knowledge and receiver complexity can render the implementation of high-performance MIMO systems impracticable.

The book addresses these issues with detailed discussions on topics such as space-time code design under partial or no transmit channel knowledge, which is an area of current research interest in the community.

Quantized precoding and antenna selection approaches are also discussed in detail. Although the treatment is theoretically intensive throughout, it contains ample discussion and solved examples, along with pictorial illustrations, to aid the interpretation of the analysis.

Considering the amount of literature on MIMO published in the last few years, the book makes a commendable effort to present a holistic approach to the subject, for which the authors deserve praise.

However, it leaves out some important upcoming application areas, such as ultrawideband (UWB) and high speed packet access (HSPA), in the context of MIMO system design. Overall, the book presents this multi-disciplinary subject well and therefore has high reference value for wireless system designers and researchers alike.

Reviewed by **Wasim Q. Malik** and **Ben Allen**